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(54) Drilling template for orthopaedic use

(57) The template consists of a basic body divided longitudinally into two parts 2, 3 with a series of guide bores 1 whose arrangement is identical with that of a bone plate to be used and whose inner diameters are adapted to the diameter of the bone screws. For the introduction of the bores into the bone, a drill bush is insertable into a selected guide bore 1. The two parts are held together by releasable connections which are removed after introduction of the bone screws and mounting of the plate fixer. The drilling template provides the exact positioning of the bone bores and the checking, during the screwing in of the bone screws with collars, of the position of the bearing surface in the correct plane.

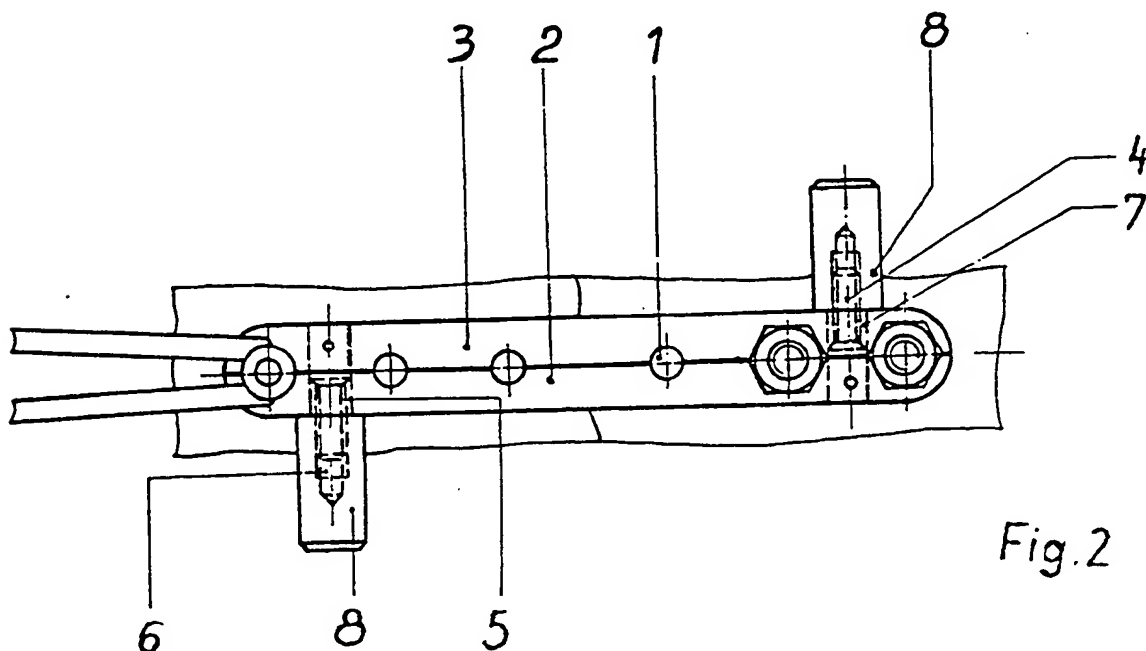
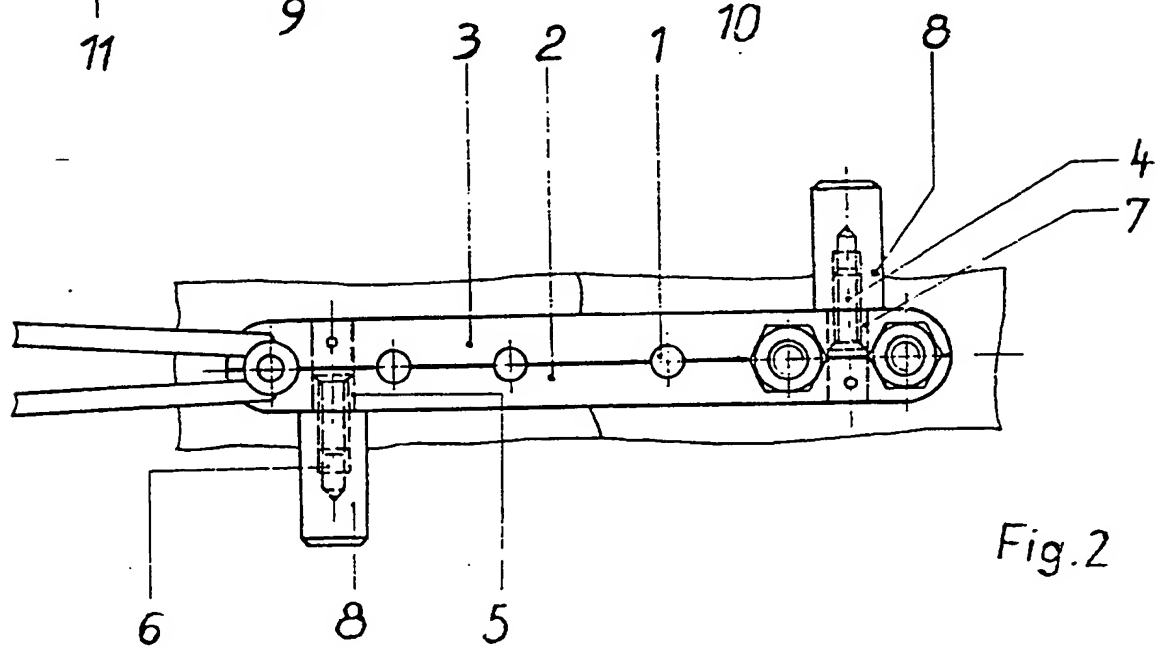
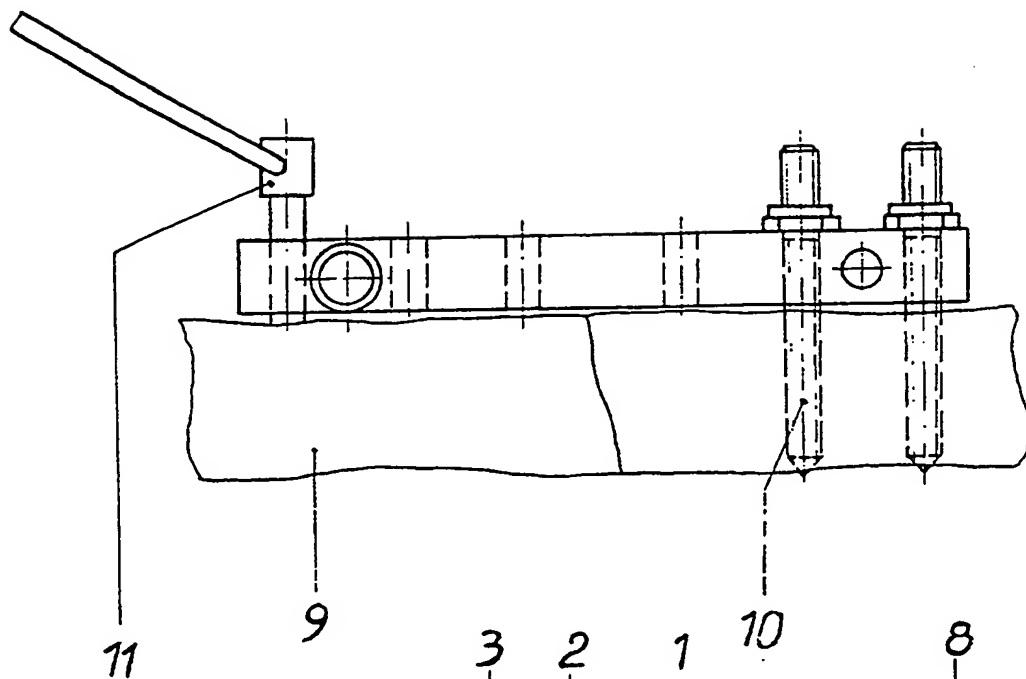


Fig. 2

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Drilling Template for Orthopaedic Use

The invention relates to a drilling template for orthopaedic use, e.g, as a plate fixer in particular for the treatment of bone fractures.

For the introduction of bone screws during the fixing of bone fractures a drilling template for the drilling of the bone drill hole is known, which consists of a drill bush with a handle and in the case of external fixing is provided with a trocar. After the drilling of the individual bone drill hole the drilling template is removed again and the bone screw is introduced. In many cases the positioning of a clamp fixer, such as that described in PL-PS 145 631 or DD-PS 258 361, is necessary. The latter consists of a bone plate with a series of holes for receiving the bone screws, together with the bone screws themselves. These bone screws possess instead of a screw head a collar, together with a headless pin onto which a nut is screwed. The bone plate is attached at a distance from the bone surface as follows; first the bone screws are screwed into the bone fragments; then the bone plate is placed to locate on the collars; and the plate is then secured by means of the nuts.

Each drill hole has to be dimensioned and positioned precisely in accordance with each hole in the bone plate, In order to avoid unnecessary stresses in the bone. The required evenness of the bearing surface of the collars has to be checked with a ruler, and the bone screws corrected accordingly. This manner of positioning the bone plate requires a high degree of experience and dexterity on the part of the surgeon and is relatively time-consuming.

The object of the invention is to develop a drilling template which, as a function of the bone plates to be used and the intended application, permits the exact positioning of the bone bores and the checking, during the screwing in of the bone screws, of the positions of the bearing surfaces. By this means the bone fixing can be facilitated, good repositioning of the bone sections be achieved, and the operating time be reduced.

Accordingly, the invention provides a drilling template for orthopaedic use, comprising a body having a plurality of guide bores which match those of a bone plate to be fitted by bone screws to a bone, wherein the body is separable along a line into two parts, which line runs through at least some of said plurality of guide bores, and is held together by releasable connections.

Sleeves for Kirschner wires can preferably be inserted into the end most guide bores. The longitudinal division preferably runs through the centre of all the bores. The slackenable connection can consist of a headless pin firmly connected to the one part and engaging with an opposite bore situated in the other part, and of a screw cap screwable onto this one part. A further slackenable connection can consist of a handle formed as a clasp, which is centred by means of an alignment pin disposed in the ends of the two part and having a displaceable clamping ring.

The advantages of the solution according to the invention are that first the bone screws occupy a position relative to one another which is determined by the dimensions of the bone plate, in order to achieve

good repositioning and avoid unnecessary stresses in the bone. Second the bone screws screwed in until the collars lie against the template, so that the bearing surfaces of the collars for the bone plates lie in one plane. Corrective work therefore becomes superfluous. For the practical case of compression there is a need for deviation of the bearing surfaces from the plane, which can be determined and set accurately by means of the drilling template. Expensive measuring and control procedures are once again superfluous.

The invention will be explained in detail below by means of an exemplifying embodiment. In the attached drawing:

Fig.1 shows a side view of the drilling template; and

Fig.2 shows a top view of the drilling template.

The drilling template consists of a basic body with a series of guide bores 1. The longitudinal dimension of the basic body is formed as a function of the bone plates to be used. The arrangement and the spacing of the guide bores 1 conforms to the intended application "neutral" or "compression" and to the individual bone plate types for the various skeleton sections. The basic body is divided in the longitudinal direction in the centre of the guide bores 1 into two parts 2 and 3. The two parts 2 and 3 are held together by means of two slackenable connections which are disposed in the end regions of the basic body.

In Figure 2 a slackenable connection is formed as follows: The part 2 is provided with a headless pin 4 and a bore 5, which are arranged respectively at

opposite ends. Likewise the part 3 is provided with a headless pin 6 and a bore 7, and when the basic body is pressed together, the headless pin 4 engages with the bore 7 and the headless pin 6 with the bore 5. A screw cap 8 is screwable onto each of the headless pins 4 and 6. In another embodiment (not shown) the slackenable connection, which is disposed at both ends of the basis body, consists of a handle formed as a spring clasp which is centred by means of an alignment pin in the parts 2 and 3 and can be opened and closed by means of a clamping ring displaceable above the handle.

In addition the drilling template can accept two sleeves for Kirschner wires which are introduced into the outer guide holes. The drilling template is fixed above the break by means of the Kirschner wires.

The guide bores 1 possess an inner diameter which makes it possible for the bone screws 10 which are to be inserted into the fragments of the bone 9 to be guided during the screwing into the bone; likewise the tapping drills during the cutting of the thread in the bone bores. A drill bush 11 with a handle and having an outer diameter which matches the inner diameter of the guide bore 1 is provided for making the bores into the bone 9. For the positioning of the plate fixer, whose bone plate is held by the bone screws at a distance above the bone surface or skin surface, the drilling template is used in the braced state. After the repositioning of the bone sections the drilling template is placed in position, the sleeves are inserted into the outer guide bores, the bone bores are introduced and the drilling template is fixed by means of Kirschner wires.

For drilling the holes into the bone the drill bush is first of all inserted into the guide bores next to the break and then worked further away outwards. After removal of the drill bush a thread can be introduced into the bone bore by means of a thread cutter which is guided in the guide bore. Then the bone screw is screwed in until it comes to rest with its collar on the surface of the template. All the bone screws are introduced into the free guide bores in this way. Then the Kirschner wires and sleeves are removed and the bone bores and the bone screws introduced in their place. In order to produce compressions in the break, the collars of the bone screws are in some cases screwed in at a distance from the surface of the drilling template. Now the bone plate can be fixed to the bone screws by means of nuts or spacers, i.e. the clamp fixer be mounted. On completion of the latter the slackenable connections are opened and the two parts of the drilling template are removed laterally beneath the collars of the bone screws.

CLAIMS

1. Drilling template for a plate fixer which consists of a number of bone screws with a collar for receiving the bone plate and a headless pin for accommodating a nut, for the fracture treatment of bones, characterised by a basic body divided longitudinally into two parts (2;3) and connected by one or more slackenable connections, with a series of guide bores (1) whose arrangement is identical with that of the bone plate to be positioned and its intended application and whose inner diameter are adapted to the diameter of the bone screws (10), as well as by a drill bush (11) insertable into the guide bores (1) for making the bores into the bone.

2. Drilling template according to claim 1, characterised in that sleeves for Kirschner wires can be inserted into the end-most guide bores (1).

3. Drilling template according to claims 1 and 2, characterised in that the longitudinal division runs centrally through the guide bores (1).

4. Drilling template according to claim 1, characterised in that the slackenable connection consists of a headless screw (4 or 6) which is firmly connected to the one part (3 or 2) and engages with an opposite bore (7 or 5) disposed in the second part (3 or 2), and of a screw cap (8) screwable onto this one part.



5. Drilling template according to claim 1, characterised in that the slackenable connection consists of a handle formed as a clasp which is centred by means of an alignment pin disposed in the ends of the parts (2; 3) and comprise a displaceable clamping ring.

6. A drilling template for orthopaedic use, comprising a body having a plurality of guide bores which match those of a bone plate to be fitted by bone screws to a bone, wherein the body is separable along a line into two parts, which line runs through at least some of said plurality of guide bores, and is held together by releasable connections.

7. A drilling template for orthopaedic use substantially as herein described with reference to the accompany drawings.